FINAL MEASUREMENT & VERIFICATION REPORT

Prepared for Pacific Coast Producers, Onsite Energy Corporation, and the California Energy Commission

SITE SUMMARY INFORMATION

Company Name:	**Pacific Coast Producers**		
Site Name:	**Pacific Coast Producers**		
Site Address:	**1376 Lemen Avenue, Woodland, CA 95776**		
Principal Site Contact:	**Randy Kohl**	**Telephone:**	**(530) 661-7601**
Plant Manager:	**Craig Powell**	**Telephone:**	**(530) 661-7606**
Onsite Energy Contact:	**Ron Allen**	**Telephone:**	**(925) 358-4264**
Assigned Lead Engineer:	**Robert Mowris, P.E.**	**Telephone:**	**(800) 786-4130**

Site: Pacific Coast Producers, Woodland, CA

PROJECTS AS PROPOSED

Project	Account Number	End Use	Utility	Program	Project Type
PCP Project	CPYT219203	Tomato Processing	PG&E	Ag. Peak kW Reduction	Custom

MEASURES FOR EACH PROJECT

Item No.	Efficiency Measure	Ex Ante Savings Estimate (kW)	(kWh/yr)	(therms)	Rebate ($)
1	Process Efficiency Upgrade	1,085	1,953,362	n/a	$217,000

PROGRAM MEASUREMENT AND VERIFICATION SAVINGS ESTIMATE

Item No.	Efficiency Measure	M&V Evaluation Savings (kW)	(kWh/yr)	(therms)
1	Process Efficiency Upgrade	1,464	2,377,768	n/a

Introduction

The Pacific Coast Producers (PCP) tomato processing facility was previously located at 32 East Tokay Street, Lodi, California. PCP moved the facility to 1376 Lemen Avenue, Woodland, California to be closer to where the tomatoes are grown in order to improve processing quality and reduce transportation costs. As part of the move, PCP upgraded the efficiency and production of the Woodland facility including installation of new energy efficient motors, equipment, and controls. They applied for a grant to defer part of the cost of the efficiency upgrades through the CEC-Sponsored Onsite Energy Corporation Agricultural Peak kW Reduction Program. Based on preliminary analysis the grant application was for $217,000 (i.e., 1,085 kW times $200/kW).

On April 30, 2002 Robert Mowris, P.E., of Robert Mowris & Associates (RMA), conducted an M&V site visit to verify installation of energy efficient equipment at PCP. Robin Dodson, PCP Plant Engineer, arranged the site visit with PCP Engineering Technician Jeff Jones. On May 10, 2002, Robert Mowris, P.E., Ron Allen, Onsite Energy Senior Project Engineer, and Randy McCall, Nexant Project Manager, conducted a second site visit to review the M&V plan and verify installation of energy efficient equipment and controls at PCP Woodland.

PG&E provides electricity and natural gas to the new Woodland site. The old site received electricity from the City of Lodi Electric Utility. Lodi historical billing data for 2001 are provided in **Attachment 1**.[1] Woodland daily production and PG&E electricity use for 2002 are provided in **Attachment 2.**

Business Description

Pacific Coast Producers has been located in Lodi for 27 years and is a grower-owned cooperative founded in 1971. Today, PCP is the largest grower-owned tomato and fruit canning operation in the United States. Pacific Coast Produces employs over 1,000 people at peak season and is one of the City of Lodi Electric Utility's largest energy users. In 2000 PCP decided to relocate their tomato processing facility to be closer to where the tomatoes are grown in order to improve processing quality and reduce transportation costs. PCP purchased the Woodland facility in 2001 and started relocating their tomato facility from Lodi to Woodland in late 2001 and early 2002. The PCP tomato processing facility is used during the tomato harvest season that runs from late June through early October. The plant is designed to process approximately 525,000 tons of tomatoes per season or 5,850 tons per day during the harvest season. Tomatoes arrive on trucks carrying approximately 20 tons of tomatoes per truck. The Woodland facility will eventually include 24 production lines. Only 18 production lines are considered in this report in order to compare to the Lodi facility that previously included 18 production lines.

Scope of Project and Efficiency Improvements

The estimated total cost for moving the Lodi facility to Woodland and making all efficiency improvements is $22 million.[2] The old Lodi facility consisted of 4 evaporators and 18 production lines with over-sized standard inefficient constant-speed motors, manual controls, 50% efficient "right-angle" gear drives; and inefficient lighting. The new PCP Woodland facility is a "state-

[1] Corrected Lodi billing data shows annual electricity use of 11,944,410 kWh/year and peak demand of 6,634 kW.
[2] Project cost of $22 million is based on information provided by Randy Kohl, PCP Woodland Controller.

of-the-art" tomato processing facility. The Woodland facility includes the following efficiency improvements:

1. Computer controls to increase production and improve processing efficiency;
2. Eliminating unnecessary motors;
3. High-efficiency motors (approximately one hundred 1/2 hp to 20 hp motors);
4. Properly-sized motors (the old motors were often oversized);
5. Variable frequency drives (VFDs);
6. High efficiency helical drives (96% efficient); and
7. Reduced lighting levels and Day Lighting.

The move to Woodland also saves transportation fuel since most of the tomatoes processed by PCP are grown in the Woodland area. The most important efficiency upgrade is the improvement in product throughput. Lodi had annual production of 325,000 tons of tomatoes per year. The Woodland facility has annual production capacity of 525,000 tons of tomatoes per year (i.e., 62% increase compared to Lodi). The ex ante peak load reduction savings of 1,085 kW were based on the overall efficiency upgrade in equipment and throughput. The ex post M&V peak load reduction savings are 1,464 kW. This final M&V report provides an analysis of the savings based on 2001/2002 production and electricity data.

Overview of Woodland Tomato Processing Facility and Energy Efficiency Improvements
The PCP Woodland Tomato Processing Facility consists of eleven (11) processing sections. Each section is described below.

1) **Bulk Dump Section.** Trucks carry tomatoes into the processing facility where they are bulk dumped from the trucks and then lifted up to the peeler and sorter sections. **Figure 1** shows one of five lifts being retrofitted with a properly sized high efficiency 5-hp VFD motor with helical drive. Previously the lift had an inefficient 20-hp hydraulic motor. **Figure 2** shows new computer (PLC) controls to allow motors to operate at increased speed to maintain optimum product throughput and efficiency. Product throughput has been increased by 60% compared to Lodi with new computer (PLC) controls. Overall peak demand and energy savings are 16.4% compared to Lodi due to computer PLC controls, high efficiency VFD motors, properly sized motors, and improved design to eliminate unnecessary motors.

Figure 1. Tomato Lift

Figure 2. Computer (PLC) Controls

2) Caustic Applicator Section. Tomatoes first go through the caustic peelers to loosen the skin (**Figure 3**). There are seven state-of-the-art caustic peelers with one per production line. Each caustic peeler includes properly sized high efficiency 3-hp motors with 96% efficient helical gear drives to replace old right angle gear drives that were 50% efficient. The old motors were 5-hp. The new motors also have computer controlled VFDs to ensure that they operate at optimal speed/efficiency. Seven caustic recirculating pumps have been changed from 30-hp to high efficiency 20-hp motors.

Figure 3. Caustic Peeler

3) Cord Peeler Section. Tomatoes go through the cord peelers where the skin is removed (**Figure 4**). There are 7 state-of-the-art cord peelers with one per production line. Each cord peeler includes properly sized high efficiency motors and computer controlled VFDs. The cord peelers have 96% efficient helical gear drives to replace old right angle gear drives that were 50% efficient. Computer controls maintain optimal production speed and efficiency.

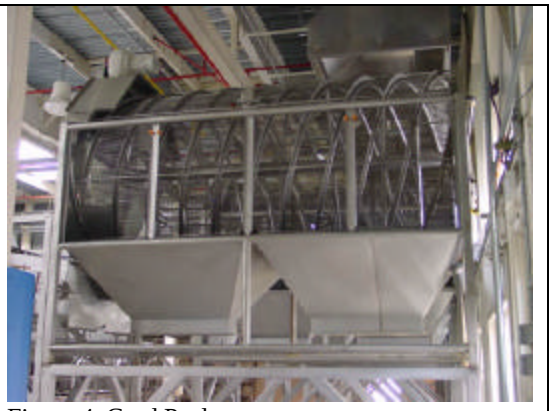
Figure 4. Cord Peeler

4a) Product Staging Section. Tomatoes are routed to product staging conveyor belts prior to sorting. This section includes properly sized energy efficient motors with helical gear drives and computer controls as shown in **Figure 5** (motors and drives are painted white). Helical gear drives are 96% efficient and replace old right angle gear drives that were 50% efficient. Computer controls maintain optimal production speed and efficiency.


Figure 5. Product Staging Section

4b) Reduced Lighting Levels and Day Lighting. Reduced lighting levels along with skylights are installed throughout the facility. The installed lighting intensity is approximately 1.1 W/sf. The old facility lighting intensity was 1.71 W/sf. With approximately 85,500 square feet of production area the total savings from lighting are estimated at 51 kW.

Figure 6. Energy Efficient Lighting

5a) Manual Sorter and Hot Break Section. There are eight manual sorters that that receive tomatoes from the bulk dump section and send tomatoes to the hot breaks (which have six new 25-hp motors at 93.6% efficiency replacing six old 30-hp motors). There are a total of eight 25-hp and eight 15-hp motors in the hot break section. Figure 7 shows the manual sorter which bypass sections 2 through. Computer controlled flow of the tomatoes reduces energy use and increases efficiency and throughput.

Figure 7. Manual Sorters

5b) Automatic Sorter Section. From the product staging section tomatoes go to the automatic sorter section that sorts tomatoes by color and size. (Figure 8). There are seven state-of-the-art automatic sorters. Each automatic sorter includes properly sized high efficiency motors and computer controlled VFDs. Computer controlled flow of the tomatoes reduces energy use and increases efficiency and throughput.

Figure 8. Automatic Sorter

6a) Evaporator/PFT Section. Tomatoes go from the sorters to the hot breaks, to the pulper feed tanks (PFT), to the pulp/finishers, to the evaporator feed tanks, and then to evaporators (**Figure 9**). From the evaporators the tomato paste goes to either the kitchen mixing tanks or the flash cooler-paste box fill section. There are 7 PFTs, 6 evaporators and 14 pulper systems. **Figure 10** shows four PFTs and 8 pumping motors. High efficiency motors are used to move tomato products through this section and back to the kitchen section. The forced-draft boiler with flue-gas recirculation was moved from Lodi, but the old 300-hp 88% efficient supply air motor was replaced with a 250-hp 96.2% efficient motor and the old 50-hp 84% efficient exhaust air motor was replaced with a 30-hp 90.2% efficient motor.

Figure 9. Evaporator Section

Figure 10. PFT Section

6b) Kitchen Mixing Tank Section. Tomato product goes from the evaporator section to one of fourteen kitchen mix systems where it is combined with herbs and spices and mixed into sauce, paste, and juice. (**Figure 11**). There are 32 tanks and 15 mixing tanks in the kitchen. Four 4 motors were upgraded to high efficiency motors used to mix tomato products in the kitchen (i.e., 2 10-hp and 2 15-hp motors). All seventeen motors in the kitchen are computer controlled to increase production and efficiency.

Figure 11. Kitchen Mixing Tanks

6c) Kitchen Pump Section. There are 32 tanks and 17 are supply tanks as shown in **Figure 12**. There are 17 pumps (15 are VFD motors). This section was upgraded to computer controls and VFD motors used to pump processed tomato product from the kitchen to the production lines. Computer controlled flow of the tomatoes reduces energy use and increases efficiency and throughput.

Figure 12. Kitchen Pumps

7) De-palletizer Section. Tin cans are supplied to the facility in the de-palletizer section. The de-palletizer section sends cans to the product fill bowl sections. There are 12 de-palletizers as shown in **Figure 13**. This section has fifteen 1-hp and thirty 1.5-hp conveying motors. High efficiency motors and controls are installed on each de-palletizer. Savings are based on new design/layout and computer controlled flow of cans that reduces energy use and increases efficiency and throughput.

Figure 13. De-palletizer Section

8a) Product Fill and Close Section. Tomatoes go from the automatic sorter section to the product fill and close section. There are seven product fill and close production lines in this section. Six of them have been improved from 250 cans/minute to 400 cans/minute. The seventh is a high-speed canning line that has been improved to 1,000 cans per minute (see **Figure 14**). Computer controlled flow of the tomatoes reduces energy use and increases efficiency and throughput.

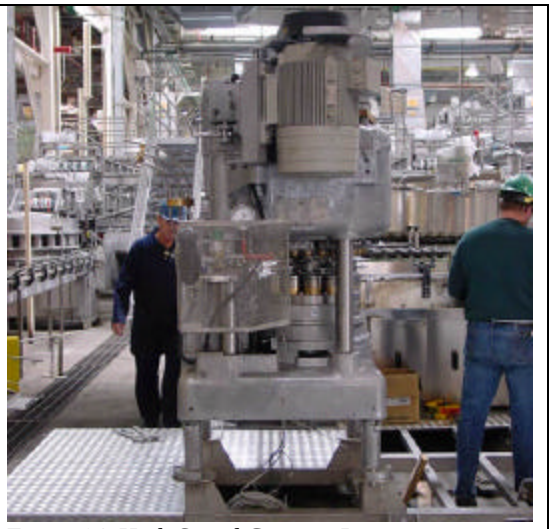

Figure 14. High Speed Canning Line.

8b) Paste Fill and Closed Section. Tomato product (i.e., sauce, paste, juice) goes from the kitchen to the paste fill and closed section as shown in **Figure 15**. There are 12 product lines. Efficiency has been increased from 250 cans/minute to 400 cans/minute. Savings are based on the new computer controls, shorter conveyor sections (reducing installed hp by 16%), and new high efficiency motors.

Figure 15. Product Fill and Close Section

8c) Rotel Section. Tomatoes or tomato products enter the Rotel section from either the automatic sorter or the kitchen. There are two Rotel lines. Two feed elevators were upgraded to high-efficiency The Rotel section was redesigned to reduce the number and size of motors. New efficient heaters were installed and new computer controls allow increased production and improved efficiency.

Figure 16. Rotel Section

9) Cooker Section. Processed or canned tomatoes finally enter the cooker section where they are cooked. There are 21 cookers and properly sized high efficiency VFD motors and controls are installed on each cooker. Computer controlled flow of the tomatoes reduces energy use and increases efficiency and throughput.

Figure 17. Cooker Section

10) Cooler Section. Once cooked the canned tomatoes enter the cooler section. There are 19 coolers and properly sized high efficiency VFD motors and controls are installed on each cooler. Computer controlled flow of the tomatoes reduces energy use and increases efficiency and throughput.

Figure 19. Cooler Section

11) Palletizing and Warehouse Section. Once cool canned tomatoes are palletized and then sent to warehouse storage. Efficiency and design improvements at Woodland allowed the removal of five 1-hp motors and five 1.5-hp motors. Computer controlled flow of the tomatoes reduces energy use and increases efficiency and throughput.

Figure 20. Palletizing and Warehouse Section

Schedule of Key Dates
Full implementation of the project was completed in July 2002 with some beta testing of equipment in July and August.

Variability in Schedule and Production: The facility operates for approximately four months per year during the tomato harvest season (i.e., late June through early October) with maintenance operations during the remainder of the year.

Square Footage of Affected Area: The affected production area is 85,500 square feet.

Savings Persistence
The expected lifetime for the new production facility is 20 years.

Historical Energy Use and Savings

In 2001, Pacific Coast Producers processed 29,320,474 cases of tomatoes with 18 production lines and electrical consumption was 6,634 kW and 11,944,410 kWh (see **Table 1**, 2001 Lodi kWh and kW).

Table 1. Historical Electricity Billing Data for Lodi in 2001[3]

Month	Account 16488-9 kWh	Account 16487 kWh	Account 32243-8 kWh	Account 16488-9 kW	Account 16487 kW	Account 32243-8 kW	2001 Lodi kWh	2001 Lodi kW
June	638,400	91,920	17,520	1,579	482	50	747,840	2,111
July	1,368,000	253,530	220,080	3,934	1,698	752	1,841,610	6,384
August	2,800,800	1,154,640	542,640	4,097	1,738	799	4,498,080	6,634
September	2,071,200	1,100,160	545,520	3,972	1,725	807	3,716,880	6,504
October	760,800	258,480	120,720	2,287	1,613	782	1,140,000	4,682
Total							**11,944,410**	**6,634**

M&V Estimated Savings

The M&V estimate of savings is based on IPMVP Option C – Whole Facility analysis. Savings are determined by measuring production and energy use throughout the pre- and post-retrofit periods. Savings are based on total production (i.e., cases of tomatoes) and total electricity use and peak demand for the 2001/2002 harvest and canning seasons (i.e., late June through early October).

M&V savings algorithms are normalized based on monthly production efficiency in terms of kWh/case and kW/case. These values are calculated for each month as follows.

Eq. 1. $$\text{kWh/case}_{\text{month}} = \frac{\sum_{\text{month}} \text{kWh}}{\sum_{\text{month}} \text{cases}}$$

Eq. 2. $$\text{kW/case}_{\text{month}} = \frac{\text{Peak kW}_{\text{month}}}{\sum_{\text{month}} \text{cases}}$$

The production efficiency values are shown in **Table 2** for Lodi and **Table 3** for Woodland (see columns D and E). In 2002, Pacific Coast Producers planned to process 41,200,000 cases of tomatoes at Woodland using 21 production lines. Based on this level of production, PCP Plant Engineer Robin Dodson estimated that the Woodland facility would use 14,039,036 kWh and the following ex ante production efficiency (i.e., kWh/case).[4]

[3] Historical electricity use is based on actual 2001 billing data from City of Lodi Electric Utility, revised 11-27-02, Bill Schmer, Lodi Electric.

[4] Mr. Dodson's estimated PCP Woodland production efficiency of 0.340753 kWh/case is based on engineering estimates of the annual energy use of 14,039,036 kWh/yr for the as-built production equipment and production capacity of 41,200,000 cases/year.

$$\text{Ex ante } \overline{\text{kWh/case}}_{\text{Woodland}} = \frac{14{,}039{,}036\ \text{kWh}}{41{,}200{,}000\ \text{cases}} = 0.340753\ \text{kWh/case}$$

The Lodi 2001 production efficiency was 0.40737 kWh/case (see **Table 2**, column D**)**. Due to delays in getting Woodland operational, the actual 2002 production was 35,565,134 cases and actual electricity use was 11,713,408 kWh. Therefore, the actual ex post production efficiency was 0.32935 kWh/case (see **Table 3**, column D).

$$\text{Ex post } \overline{\text{kWh/case}}_{\text{Woodland}} = \frac{11{,}713{,}408\ \text{kWh}}{35{,}565{,}143\ \text{cases}} = 0.32935\ \text{kWh/case}$$

Table 2. Lodi Historical Production and Electricity Use for 2001

	A	B	C	D = A / C	E = B / C
Month	**2001 Lodi kWh**	**2001 Lodi kW**	**2001 Lodi Cases**	**Lodi kWh/case**	**Lodi kW/case**
June	747,840	2,111	1,282,465	0.58313	0.0016462
July	1,841,610	6,384	3,158,162	0.58313	0.0020214
August	4,498,080	6,634	11,377,596	0.39535	0.0005831
September	3,716,880	6,504	11,352,251	0.32741	0.0005729
October	1,140,000	4,682	2,150,000	0.53023	0.0021777
Total	**11,944,410**	**6,634**	**29,320,474**	**0.40737**	

Woodland has a 150-hp north well pump and a 75-hp south well pump. The well pumps run at close to full load (i.e., 90%) throughout the day to provide water for tomato processing. Peak electricity use for the well pumps is 161 kW based on the following equation.[5]

$$\text{kW}_{\text{well pumps}} = \frac{[150\ \text{hp} + 75\ \text{hp}] \times 0.746\ \text{kW/hp} \times \text{Load Factor}}{\text{Motor Efficiency}} = \frac{225\ \text{hp} \times 0.746\ \text{kW/hp} \times 90\%}{94\%} = 161\ \text{kW}$$

The 2002 Woodland kW values are shown in **Table 3**, column B. These kW values are adjusted to account for the well pumps that were not required at Lodi (Lodi used city water).[6]

[5] Pump motors are 94% efficient (NEMA class B) with an assumed average load factor of 90%. Pump motors could not be directly measured since site visits were scheduled during construction and prior to production.

[6] Woodland kW values are based on the PG&E 12-6 PM peak kW values taken from daily 15-minute meter data (PG&E CPY-T2-19203 Aggregate). The PG&E kW values are reduced by 161 kW to account for two well pumps. The PG&E 12-6 PM peak demand was 6,413 on 8-9-02, but this was in the middle of a three-day beta test of newly installed equipment. Another beta test of equipment occurred on 7-30-02 for approximately one hour. Excluding these four beta test days, the actual peak demand was 5,954 kW on 8-20-02 and the adjusted peak demand was 5,793 kW (i.e., 5,954 kW - 161 kW) with production at 402,669 cases (77% of peak production).

Table 3. Woodland Historical Production and Electricity Use for 2002

	A	B	C	D = A / C	E = B / C
Month	**2002 Woodland kWh**	**2002 Woodland kW**	**2002 Woodland Cases**	**Woodland kWh/case**	**Woodland kW/case**
July	1,871,950	5,314	4,916,156	0.38078	0.0010809
August	4,172,919	5,793	12,748,288	0.32733	0.0004544
September	3,944,069	5,646	13,676,143	0.28839	0.0004128
October	1,724,470	5,659	4,224,556	0.40820	0.0013395
Total	**11,713,408**	**5,793**	**35,565,143**	**0.32935**	

The normalized M&V analysis assumes Woodland production efficiency for the 18 lines at Lodi in 2002. Based on this assumption, the M&V estimate of 2002 Lodi usage is 5,170 kW and 9,566,642 kWh (see **Table 4**, column E and F). The M&V savings are 1,464 kW and 2,377,768 kWh (see **Table 4**, column G and H). These savings are based on the difference between 2001 Lodi consumption and 2002 Lodi consumption assuming Woodland production efficiency. The normalized peak kW savings are based on the following equation for August (the peak month).

$$\text{kW}_{\text{savings}} = 6{,}634\ \text{kW}_{\text{Lodi}} \times \left[1 - \frac{\text{Woodland kW/case}_{\text{August}}}{\text{Lodi kW/case}_{\text{August}}}\right] = 6{,}634\ \text{kW} \times \left[1 - \frac{0.0004544}{0.0005831}\right] = 1{,}464\ \text{kW}$$

The normalized annual kWh savings are based on the following equation.

$$\text{kWh/yr}_{\text{savings}} = \sum_{\text{i=June+July}}^{\text{October}} \left\{\text{Lodi kWh/month}_{\text{i}} \times \left[1 - \frac{\text{Woodland kWh/case}_{\text{i}}}{\text{Lodi kWh/case}_{\text{i}}}\right]\right\} = 2{,}377{,}768\ \text{kWh/yr}$$

Table 4. Normalized M&V kWh and kW Savings for 2002[7]

	A	B	C	D	E	F	G = A – E	H = B - F
Month	**2001 Lodi kWh**	**2001 Lodi kW**	**2001 Lodi Cases**	**2002 Woodland Cases**	**2002 Lodi Assuming Woodland Efficiency kWh**	**2002 Lodi Assuming Woodland Efficiency kW**	**2002 Savings kWh**	**2002 Savings kW**
June + July	2,589,450	6,384	4,440,627	4,916,156	1,690,880	3,414	898,570	2,970
July	4,498,080	6,634	11,377,596	12,748,288	3,724,248	5,170	773,832	1,464
August	3,716,880	6,504	11,352,251	13,676,143	3,273,881	4,687	442,999	1,817
September	1,140,000	4,682	2,150,000	4,224,556	877,633	2,880	262,367	1,802
Total	**11,944,410**	**6,634**	**29,320,474**	**35,565,143**	**9,566,642**	**5,170**	**2,377,768**	**1,464**

For comparison, the PCP Woodland top 50 production days for 2002 are shown in **Table 5**. The top Woodland production day of 522,381 cases in August 2002 had unadjusted peak demand of 5,574 kW. This is 1,060 kW less than the Lodi 2001 August peak day of 6,634 kW. Note that the adjusted peak demand is 5,793 kW on the 50th highest production day (i.e., 402,669 cases). The entire 2002 production season and electricity use for Woodland are shown in **Attachment 2**.

[7] Normalized M&V savings for Lodi are based on 2002 Woodland production and adjusted billing data assuming 18 production lines (same as Lodi). Woodland has 21 production lines installed.

Table 5. PCP Woodland Top 50 Production Days for 2002[8]

#	Date	Cases/day	kWh/day	PG&E 12-6 PM kW	Adjusted 12-6 PM kW	Note
1	29-Aug-02	522,381	136,762	5,574	5,413	
2	14-Sep-02	502,312	133,390	5,607	5,446	
3	11-Sep-02	499,842	134,228	5,698	5,537	
4	4-Sep-02	497,978	132,416	5,637	5,476	
5	25-Sep-02	497,149	135,820	5,714	5,553	
6	16-Sep-02	489,546	133,159	5,658	5,497	
7	24-Sep-02	484,056	133,728	5,676	5,515	
8	6-Sep-02	483,479	134,863	5,725	5,564	
9	7-Sep-02	482,768	135,064	5,722	5,561	
10	17-Sep-02	482,023	132,450	5,597	5,436	
11	22-Aug-02	479,782	137,783	5,802	5,641	
12	17-Aug-02	477,704	140,468	5,897	5,736	
13	14-Aug-02	477,246	133,287	5,705	5,544	
14	26-Sep-02	476,701	135,819	5,770	5,609	
15	15-Sep-02	476,692	132,563	5,693	5,532	
16	31-Aug-02	476,242	130,586	5,610	5,449	
17	24-Aug-02	475,078	140,198	5,866	5,705	
18	21-Aug-02	473,424	139,100	5,867	5,706	
19	23-Sep-02	470,738	134,652	5,663	5,502	
20	9-Sep-02	468,200	125,646	5,332	5,171	
21	20-Sep-02	466,635	132,519	5,743	5,582	
22	28-Sep-02	464,754	136,522	5,807	5,646	
23	10-Sep-02	464,410	131,118	5,579	5,418	
24	18-Sep-02	461,226	131,326	5,624	5,463	
25	21-Sep-02	460,180	134,458	5,627	5,466	
26	27-Aug-02	460,014	136,762	5,889	5,728	Power surge.
27	3-Sep-02	455,654	131,702	5,654	5,493	
28	16-Aug-02	454,334	138,580	5,887	5,726	
29	8-Sep-02	453,932	125,334	5,452	5,291	
30	5-Sep-02	453,632	132,091	5,652	5,491	
31	22-Sep-02	453,176	133,887	5,711	5,550	
32	19-Sep-02	452,805	132,240	5,617	5,456	
33	23-Aug-02	449,563	136,386	5,839	5,678	
34	3-Oct-02	449,516	135,985	5,820	5,659	
35	1-Oct-02	449,189	136,325	5,785	5,624	
36	27-Sep-02	448,996	136,198	5,781	5,620	
37	8-Aug-02	445,247	138,415	6,106	5,945	Beta test of equipment
38	19-Aug-02	438,194	139,487	5,919	5,758	
39	2-Sep-02	438,193	127,781	5,522	5,361	
40	28-Aug-02	436,863	131,515	5,942	5,781	
41	29-Sep-02	433,380	134,779	5,754	5,593	
42	2-Oct-02	431,727	130,568	5,472	5,311	
43	30-Aug-02	429,688	128,746	5,447	5,286	
44	15-Aug-02	426,786	133,890	5,589	5,428	
45	6-Aug-02	418,505	124,378	5,260	5,099	
46	9-Aug-02	414,306	146,492	6,413	6,252	Beta test of equipment
47	3-Aug-02	409,800	131,839	5,608	5,447	
48	26-Aug-02	408,632	138,118	5,936	5,775	
49	5-Aug-02	404,017	129,235	5,512	5,351	
50	20-Aug-02	402,669	135,181	5,954	5,793	

[8] PG&E 12-6 PM kW values are from daily 15-minute meter data (PG&E CPY-T2-19203 Aggregate). Five days of data are not used in the analysis due to the following reasons: 1) missing kW data on August 13, 2002; 2) beta testing equipment on July 30 and August 8-10; and 3) power surge on August 27. Adjusted 12-6 PM kW is reduced by 161 kW to account for two well pumps that were not required at Lodi

ATTACHMENTS

1. Lodi Electric Utility Department 2001 Historical Billing Data for PCP

2. PCP Woodland Daily Production and PG&E Electricity Use for 2002.

Attachment 1. Lodi Electric Utility Department 2001 Historical Billing Data for PCP

CITY OF LODI

ELECTRIC UTILITY DEPARTMENT

ALAN N. VALLOW, DIRECTOR

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Month	Account 16488-9 kWh	Account 16487 kWh	Account 32243-8 kWh	Account 16488-9 kW	Account 16487 kW	Account 32243-8 kW	2001 Lodi kWh	2001 Lodi kW
June	638,400	91,920	17,520	1,579	482	50	747,840	2,111
July	1,368,000	253,530	220,080	3,934	1,698	752	1,841,610	6,384
August	2,800,800	1,154,640	542,640	4,097	1,738	799	4,498,080	6,634
September	2,071,200	1,100,160	545,520	3,972	1,725	807	3,716,880	6,504
October	760,800	258,480	120,720	2,287	1,613	782	1,140,000	4,682
Total							**11,944,410**	**6,634**

Attachment 2. PCP Woodland Daily Production and PG&E Electricity Use for 2002[9]

Date	Cases	kWh/day	PG&E 12-6 PM kW	Adjusted 12-6 PM kW	Notes
15-Jul-02	95,392	68,382	3,275	3,114	
16-Jul-02	242,304	91,497	4,119	3,958	
17-Jul-02	234,857	115,377	4,366	4,205	
18-Jul-02	233,198	96,360	4,298	4,137	
19-Jul-02	280,210	102,429	4,436	4,275	
20-Jul-02	305,907	112,180	4,820	4,659	
21-Jul-02	287,885	107,822	4,594	4,433	
22-Jul-02	281,425	114,551	4,913	4,752	
23-Jul-02	272,916	110,290	4,582	4,421	
24-Jul-02	360,278	115,828	4,893	4,732	
25-Jul-02	294,372	114,347	4,889	4,728	
26-Jul-02	319,089	114,820	4,830	4,669	
27-Jul-02	323,673	116,576	4,915	4,754	
28-Jul-02	286,157	112,120	4,777	4,616	
29-Jul-02	337,860	120,289	5,244	5,083	
30-Jul-02	372,541	128,998	6,085	5,924	Beta Test of Equipment.
31-Jul-02	388,092	130,084	5,475	5,314	
1-Aug-02	371,973	130,795	5,617	5,456	
2-Aug-02	399,864	130,912	5,586	5,425	
3-Aug-02	409,800	131,839	5,608	5,447	
4-Aug-02	260,171	112,186	4,553	4,392	
5-Aug-02	404,017	129,235	5,512	5,351	
6-Aug-02	418,505	124,378	5,260	5,099	
7-Aug-02	396,434	122,407	5,192	5,031	
8-Aug-02	445,247	138,415	6,106	5,945	Beta Test of Equipment
9-Aug-02	414,306	146,492	6,413	6,252	Beta Test of Equipment
10-Aug-02	369,344	145,080	6,203	6,042	Beta Test of Equipment
11-Aug-02	330,911	122,138	5,478	5,317	
12-Aug-02	273,896	131,336	4,746	4,585	
13-Aug-02	433,097	200,203			Missing kW Data
14-Aug-02	477,246	133,287	5,705	5,544	
15-Aug-02	426,786	133,890	5,589	5,428	
16-Aug-02	454,334	138,580	5,887	5,726	
17-Aug-02	477,704	140,468	5,897	5,736	
18-Aug-02	284,315	116,925	4,957	4,796	
19-Aug-02	438,194	139,487	5,919	5,758	
20-Aug-02	402,669	135,181	5,954	5,793	
21-Aug-02	473,424	139,100	5,867	5,706	
22-Aug-02	479,782	137,783	5,802	5,641	
23-Aug-02	449,563	136,386	5,839	5,678	
24-Aug-02	475,078	140,198	5,866	5,705	
25-Aug-02	247,808	113,729	4,865	4,704	
26-Aug-02	408,632	138,118	5,936	5,775	
27-Aug-02	460,014	136,762	5,889	5,728	Power Surge
28-Aug-02	436,863	131,515	5,942	5,781	
29-Aug-02	522,381	136,762	5,574	5,413	
30-Aug-02	429,688	128,746	5,447	5,286	
31-Aug-02	476,242	130,586	5,610	5,449	
1-Sep-02	329,466	111,953	4,299	4,138	
2-Sep-02	438,193	127,781	5,522	5,361	

[9] PG&E 12-6 PM kW values are from daily 15-minute meter data (PG&E CPY-T2-19203 Aggregate). Five days of data are not used in the analysis due to the following reasons: 1) missing kW data on August 13, 2002; 2) beta testing equipment on July 30 and August 8-10; and 3) a power surge on August 27. Adjusted 12-6 PM kW is reduced by 161 kW to account for two well pumps that were not required at Lodi

Attachment 2. PCP Woodland Daily Production and PG&E Electricity Use for 2002[9]

Date	Cases	kWh/day	PG&E 12-6 PM kW	Adjusted 12-6 PM kW	Notes
3-Sep-02	455,654	131,702	5,654	5,493	
4-Sep-02	497,978	132,416	5,637	5,476	
5-Sep-02	453,632	132,091	5,652	5,491	
6-Sep-02	483,479	134,863	5,725	5,564	
7-Sep-02	482,768	135,064	5,722	5,561	
8-Sep-02	453,932	125,334	5,452	5,291	
9-Sep-02	468,200	125,646	5,332	5,171	
10-Sep-02	464,410	131,118	5,579	5,171	
11-Sep-02	499,842	134,228	5,698	5,537	
12-Sep-02	357,893	121,001	5,306	5,145	
13-Sep-02	384,200	126,337	5,505	5,344	
14-Sep-02	502,312	133,390	5,607	5,446	
15-Sep-02	476,692	132,563	5,693	5,532	
16-Sep-02	489,546	133,159	5,658	5,497	
17-Sep-02	482,023	132,450	5,597	5,436	
18-Sep-02	461,226	131,326	5,624	5,463	
19-Sep-02	452,805	132,240	5,617	5,456	
20-Sep-02	466,635	132,519	5,743	5,582	
21-Sep-02	460,180	134,458	5,627	5,466	
22-Sep-02	453,176	133,887	5,711	5,550	
23-Sep-02	470,738	134,652	5,663	5,502	
24-Sep-02	484,056	133,728	5,676	5,515	
25-Sep-02	497,149	135,820	5,714	5,553	
26-Sep-02	476,701	135,819	5,770	5,609	
27-Sep-02	448,996	136,198	5,781	5,620	
28-Sep-02	464,754	136,522	5,807	5,646	
29-Sep-02	433,380	134,779	5,754	5,593	
30-Sep-02	386,127	131,025	5,709	5,548	
1-Oct-02	449,189	136,325	5,785	5,624	
2-Oct-02	431,727	130,568	5,472	5,311	
3-Oct-02	449,516	135,985	5,820	5,171	
4-Oct-02	329,053	110,581	4,953	4,792	
5-Oct-02	319,432	107,326	4,500	4,339	
6-Oct-02	178,643	96,468	4,301	4,140	
7-Oct-02	303,253	147,309	4,297	4,136	
8-Oct-02	214,100	100,551	4,040	3,879	
9-Oct-02	152,886	78,659	3,912	3,751	
10-Oct-02	169,893	97,539	3,571	3,410	
11-Oct-02	227,747	112,703	3,612	3,451	
12-Oct-02	232,152	85,801	3,571	3,410	
13-Oct-02	165,116	78,342	3,519	3,358	
14-Oct-02	138,297	74,356	3,359	3,198	
15-Oct-02	187,592	81,272	3,474	3,313	
16-Oct-02	153,709	78,612	3,277	3,116	
17-Oct-02	122,251	72,073	3,323	3,162	